The Environmental Analysis Report

"Galiuro Mountains Prescribed Natural Fire Plan"

Safford Ranger District

CORONADO National Forest

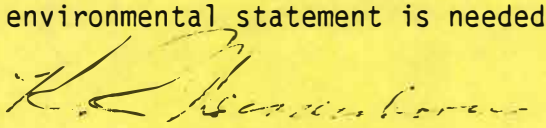
MAY 25 1978

ROCKY MOUNTAIN STATION

The environmental effects of this prescribed natural fire plan, as opposed to all alternatives, are negligible.

To date all contacts, both formal and informal, with the local public have produced only favorable comment.

Public acceptance of prescribed natural fire is a fact. No environmental statement is needed.



K. R. WEISSENBORN
Forest Supervisor

PLAN FOR PRESCRIBED BURNING

BY NATURAL FIRES

GALIURO MOUNTAINS

Safford Ranger District

Coronado National Forest

Region 3

Report Prepared by _____ 6-29-77
District FMO — Date

Report Recommended by _____ 6/24/77
District Ranger — Date

Report Approved by _____ 7/1/77
Forest Supervisor — Date

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ROCKY MT. FOREST & RANGE
EXPERIMENT STATION

This draft contains the environmental analysis report and proposed plan for prescribed natural fire in the Galiuro Mountains. The Galiuro Mountains are located in Southeastern Arizona, approximately 45 air miles northeast of Tucson, on the Safford Ranger District, Coronado National Forest (see map). The range encompasses 138,000 acres, 52,000 of which are designated wilderness.

Upon implementation of the attached draft, the Forest Supervisor may allow lightning fires, within given prescription guidelines, to once again become part of the natural component of the Galiuro's ecology.

The area is currently being managed for dispersed recreation, forage production maintaining existing wildlife populations, and maintaining air and water quality. The proposed natural fire plan should have minimal effect on all of the above and no lasting adverse environmental effect.

Wood smoke pollutants will be introduced into the atmosphere, but there is sufficient air movement to keep air quality at satisfactory levels. Immediately following a burn, scenic quality will be temporarily lessened; but under the prescibed moisture conditions, grass and forb cover should recover that same season. Waterways would not be affected negatively. Forage production should increase the first growing season following the burn. Heavy accumulations of brush may be cleared out by fire, improving access for recreationists, cattle and wildlife.

Public input began in April, 1976. Ranchers, civic groups, state and federal agencies were contacted and submitted recommendations. The basic foundation for decisions arriving at the proposal were made by fire control personnel working with staffmen to apply criteria to the Galiuro Mountains.

SUMMARY

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DESCRIPTION

The Galiuro Mountains have retained their primeval character and appear to have been primarily affected by forces of nature.

The 138,246 acre range is located 35 air miles northwest of Willcox and 45 air miles northeast of Tucson on the Safford Ranger District of the Coronado National Forest. Within the range are 52,717 acres of wilderness area and 700 acres of private land in three areas along the east end. These mountains are a very rough and brushy sample of the block-like uplifts rising abruptly from level plains which are characteristic of Southern Arizona. It is bisected by two main canyons, Rattlesnake and Redfield. The Wilderness boundary generally follows the crest of both the east and west divide.

Geological erosion has produced many rugged cliffs and steep slopes which have brightly colored exposed soils and rocks. The majority of the wilderness is so steep, rocky and brushy that travel by horseback and on foot is limited to cleared and graded trails.

The more prominent high points along the east divide includes Bassett Peak at 7,671 feet, Kennedy Peak at 7,540 feet and Sunset Peak at 7,094 feet. On the west divide is Rhodes Peak at 7,116 feet, Maverick Mountain at 6,990 feet and Kielberg Peak at 6,880 feet. Several places along the western boundary drop to 4,000 feet.

The vegetation varies from semi-desert grassland types to the mixed conifer types. On the majority of the north and east facing slopes, there are dense stands of manzanita, live oak and mahogany; on the south and west slopes are grasses and thin brush. The higher slopes and ridgetops have moderate to dense stands of juniper, pinyon and oak trees. Along the canyon bottoms and on the north slopes of the higher elevations, Arizona cypress, Ponderosa pine, Chihuahua pine, Mexican white pine, Douglas fir and occasional white fir are found. Deciduous trees such as sycamore, alder, maple, ash and walnut grow along the watercourse banks.

The annual precipitation ranges from 14 to 18 inches, with most of it occurring between July and September. There are nine permanent springs and four rubble dams. No perennial streams or lakes exist within the area.

Grazing, mining, fire suppression and limited amounts of recreation are the only human activities that occur in the Galiuro Mountains. Mining can be traced historically from the 1880's to the 1920's. At the present time, there are no active mines, only relics of an era gone by.

Cattle grazing started about 1885 and increased rapidly for the next few years. By 1890, however, the lack of a market and drought conditions caused heavy overgrazing by domestic livestock, and the grassland came back as brush leaving the area less desirable for further grazing.

Fire suppression, or lack of it, presents an interesting history. Old fire scars show that practically the entire range, especially the ridges and peaks, has burned at one time or another. In the late 1930's and early '40's fires were left to burn. Fire crews were dispatched to watch the fire and act on it only if they burned into undesirable areas. From the latter 1930's to '60's, there were no Class A fires reported or recorded. From evidence on the ground, however, it appears that a considerable number of Class A and B fires burned undetected. During this period, action was taken on four lightning fires, three of which were less than ten acres and the other one over 300 acres. At this time, there were four man-caused fires, one each in Class B, C, D, and F.

Later in the 1960's a more intense fire suppression effort was begun using aerial detection, dispatchers, air tankers and helitack. It logically follows that in the next 15 years three times more fires were detected due to more sophisticated methods. The acreage per fire, however, was reduced by one half also due to more sophisticated methods and early detection. Of 43 fires, 34 were under one-quarter acre and only three were over 300 acres.

Ninety-five percent of the fires in the Galiuro Mountains are caused by lightning, which occurs from late June to early September, and coincides with the summer rainy season. This prescribed natural fire plan calls for prompt, aggressive suppression of these fires outside of the prescriptions when the measured fire danger is above specific levels for each fuel model. It will enable the Forest Supervisor to let natural fires, within given prescription guidelines, once again become part of the natural component of Galiuro ecology.[1]

PROPOSED PRESCRIBED NATURAL FIRE PLAN

The prescribed natural fire plan will be used only on lightning-caused fires in areas having a preattack plan through Step 5, providing that there is no threat to life or private property and that it is within the National Forest boundary. Air quality conditions must be acceptable and state and county air quality agencies informed of a prescribed natural fire in progress.

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[1]Appendix 7, P. 38.

If all the above criteria are met and the fire is within the prescription for fuel models[2] and manning classes,[3] delayed initial attack will be allowed. If any one of the criteria or prescriptions is not met, the fire will be suppressed.

In the event that a fire is about to escape from an approved preattack block onto an unapproved block, the Forest boundary onto private land, or the Forest boundary onto private land within the Forest boundary, then only that portion of the fire will be suppressed.[4]

OBJECTIVES

The purpose of this prescribed natural burn plan for the Galiuro Mountains is to:

1. Let fire play a more natural role in maintaining a wide variety of plant communities.

2. Avoid hazardous buildups of fuels.

3. Improve range and wildlife habitat by eliminating dense brush stands and allowing more desirable forage and browse species to become established.

4. Increase spring and stream flow by natural clearing of dense brush stands.

5. Improve access for wilderness campers, wildlife and livestock.

SITUATION

Air

Air quality over the planned natural fire area is generally good due to prevailing southwest winds.

Under certain conditions emissions from smelters in San Manuel, Globe, and ocassionally Douglas, will blanket the area lowering the air quality and visibility. (Emissions from the San Manuel smelter are a common part of the landscape).

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[2]Appendix 1, P. 19.

[3]Appendix 2, P. 21.

[4]Appendix 3, P. 23.

Water

The Galiuro Mountain range supplies water to Sulphur Spring Valley, Aravaipa Creek and San Pedro River drainage systems. The largest use of water within the National Forest boundary is by livestock. The existing water rights inventory indicates this use to be greater than 97 percent.

Increased brush density (due to suppression of all fires), along with a reduction of grass, has caused surface (sheet) and rill erosion above expected rates. This is causing aggradation in the drainage systems.

Wildlife

There is a wide variety of wildlife. Bear, mule deer, whitetail deer, antelope, coatimundi, gambel quail, Mearn's quail, dove, mountain lion, bobcat, grey fox, coyote, and numerous other wildlife species make their home in the Galiuro Mountains. The absence of human encroachment makes an ideal situation for many of these wild creatures.

The deer population in the upper portions of the entire Galiuro range is very low with few exceptions. The only place deer use regularly are areas which have burned recently (the past ten years) or areas that burn repeatedly such as Grassy Ridge and China Peak. The preferred browse species are abundant over the entire Galiuro range; much of it is overmature and out of reach of the deer.

Grazing

At the present time there are 14 permittees grazing 18 allotments with an obligation of 1,630 head of cattle.

Human Developments

There are three administrative sites in the Galiuro Mountains. Each has a cabin, storage shed and corrals. The Jackson cabin and Powers Garden sites are used also by the grazing permittees who share maintenance responsibilities.

There are also four old mining cabins and other mining antiquities which are of historical interest. One of these, the cabin at Power's Mine, is listed in the National Historical Register.

There is a line cabin in Redfield Canyon constructed by the rancher in the early 1960's. This is a nonconforming structure and is planned for removal.

Other improvements are range fences, waterlines and water developments. These are maintained by the grazing permittees. There are approximately 110 miles of inventoried trails on the Galiuro Mountains. Signing and maintenance are done by the Forest Service.

Wilderness

Fifty-two thousand acres within the Galiuro Mountains were designated as Wilderness in 1932 and are managed in accordance with the Wilderness Act of 1964. The remainder of the Galiuro Mountains is being proposed for study for wilderness in the Endangered American Wilderness Act of 1977.

An estimated 2,500 visitor days use was reported in 1976. This use is increasing rapidly as this relatively unknown area receives more publicity. Use is primarily by backpackers. Horseback use is limited, as there are no outfitters or stables in the vicinity.

The roads up the corridor via Rattlesnake Canyon and into Jackson cabin from the south receive moderate use from ORV enthusiasts. Some of these users venture into the wilderness on short hikes.

Wilderness travel is restricted primarily to trails due to the topography and dense brush.

Recreation

Recreation use is primarily by people seeking a wilderness experience or the ORV users. There is some family picnicking in the Sunset and Copper Creek areas and moderate hunting pressure in the lower elevations during the established seasons.

Aesthetics

The rugged scenic appearance is one of the primary assets of the Galiuro range. The two divide trails offer panoramic views of much of the range, as well as the Sulphur Springs and San Pedro valleys. Many connecting trails, however, have somewhat of a tunnel effect due to the dense vegetation, offering limited viewing.

Timber

There are no commercial stands of sawtimber on this range of mountains. Tree species throughout the Galiuros are primarily pinyon, juniper, and a variety of oak. Ponderosa and Apache pines are common in most drainages, intermixed with riparian type. There are a few unique areas supporting large Douglas firs in the 40" D.B.H. category. There is also one isolated stand of aspen near the upper end of Douglas Canyon.

A limited number of permits for fuelwood and posts are issued for the Sunset area.

IMPACTS

Air

Air quality effects will be minimal and in accordance with the Arizona Department of Health Services, Rules and Regulations for Air Pollution Control.[5] The Galiuro Mountains are in the proximity of several smelters. In light of the large amount of smoke given off by these smelters, the smoke from a grass and/or brush fire would go relatively unnoticed.

Water

Waterways would not be affected negatively. The conversion from brush to grass cover will help decrease surface erosion from high intensity summer thunderstorms. This surface erosion presently is causing stream channel degradation in numerous canyons. Water developments might suffer some loss of plastic pipe due to fire but should be minimal. Water quality will decrease for a short period after each burn due to nutrient loading (ash) into the ephemeral streams; however, most of the ash will remain on the slopes providing a source of nutrient for new plant species.

Soil

Immediately after a burn, surface erosion may increase if high intensity sustained rains are received; however, additional low-growing ground cover can be expected which will result in decreased soil degradation. The density of resinous vegetation, such as juniper and manzanita, is low enough; even with an extremely hot sustained fire, hydrophobic soils should not develop. Soil fertility should not be decreased and probably will increase due to additional nutrients that are available from the ash.

Grazing

There could be some loss of livestock forage following a fire but this should not be in an amount that would affect the carrying capacity. Based on a number of variables and past history, large fires in the usable livestock range are not anticipated. Under normal weather conditions, the burned areas would recover that same season, probably with improved vigor.

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[5]State Air Pollution Regulations, R 9-3-107c, P. 9.

There could be some loss due to cattle being trapped by fire, but this is highly unlikely as the fires are expected to creep and there are rocky areas with little fuel readily available to most grazing areas. This possible loss was discussed with the grazing permittee most likely to be affected. He felt the small risk involved would be outweighed, even though burned acreage is expected to be low.

There could be some damage to range improvements, but these range improvements consist of rock rubble dams, earthen dams, springs, numerous pipelines with drinking troughs, corrals and fences. The majority of the pipeline is buried plastic lines. The fences are mostly barbed wire with steel posts. A large portion of the interior fences are short stretches across canyons or gaps on ridges. All are maintained by the grazing permittees.[6]

Wildlife

There could be a temporary loss of wildlife habitat, but this would not be detrimental as there are extensive unused areas. Fire which would occur under the limitations of this proposal would undoubtedly be beneficial to wildlife. Openings with added edge effect would be created. Access would be improved; quality and available quantity would be improved. Fawn survival should increase. This is based on conclusions from a 1976 study done by the Arizona Game and Fish Department which indicated that fawn survival probably was related directly to the quality of the doe diet.[7]

Human Improvements

Fences, cabins, and trail signs exist within the prescribed natural fire area. A fire would not burn hot enough to harm most fences, except where they have wooden stays or corner posts. Replacement costs would be far less than suppression costs.

A number of cabins, including Jackson, Knothe, Powers, Powers Garden and Deer Creek, will be protected from fire. Most of these are relics of the mining era.

The trail signs in the area are antiquated and are being replaced as trail work is being done. Signs will be placed in areas cleared to reduce the chance of loss by fire.

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[6]Appendix 4, P. 25.

[7]Appendix 5, P. 27.

Wilderness

The Wilderness concept would be enhanced, as fire would be allowed to play its natural role in maintaining a wide variety of plant and animal communities.

In some areas, off-trail travel could result if dense brush stands were burned.

Recreation

Impacts on recreation would be minimal and of short duration.

Aesthetics

Scenic quality will be lessened temporarily in the immediate area of the burn.

Timber

Some kill may result from a very hot fire; but generally, under the prescribed conditions, undergrowth will be removed allowing for regeneration of pine, fir, aspen, etc., perpetuating the natural mosaic created by fire.

UNAVOIDABLE ADVERSE EFFECTS

Air quality would be deteriorated temporarily by smoke.

Increased surface erosion and nutrient loading into adjacent ephemeral stream channels may occur for a short period after each burn until reestablishment of perennial grass species. Generally, these adverse effects should be minimal.

There will be a loss of wildlife habitat for a short period of time, with more abundant and favorable food supply later.

Some loss of livestock forage will occur.

Fencing may be lost, but replacement costs would be much less than suppression costs.

There will be no adverse effects to the wilderness.

Recreationists may have to alter their plans or change location if a fire were burning in their area.

Scenic quality would be lessened temporarily immediately following a fire, but grass and forbs cover should recover the same season.

There will be no adverse effects on timber.

SHORT-TERM USE--LONG-TERM PRODUCTIVITY

The long-term productivity of this part of the National Forest will be increased by returning fire to a more natural role.

IMPLEMENTATION

Prescriptions for each fuel model will be used to carry out the prescribed natural fire plan. The general public and public agencies have been informed.[8] Administration of these actions is the job of the District Ranger or his designated representative.

PROCESS FOR CHANGE

During the implementation of the prescribed natural fire plan, continued evaluation and monitoring will be an ongoing process whereby decisions for necessary changes may be made.

CONSULTATION

The public input segment began in April, 1976. The ranchers who would be affected were contacted and their feelings assessed. All remarks were recorded, and without exception, all were in accord with instituting a prescribed natural fire plan.

Civic groups, such as the Lion's Club, Rotary, etc., were given opportunities at meetings for question and answer sessions. Forest Service personnel from various departments were contacted and submitted recommendations.

The basic foundation for decisions arriving at the proposal were made by fire control personnel working with staffmen to apply criteria to the Galiuro Mountains.

Comments were received from the following agencies, organizations and individuals:

Permittees:	Mike Isley	Virgil Mercer
	Alvin Browning	Vic Larson
	Joe Lane	Forrest Froelich
	Ted Lee	Paul Haas
	Charles Proctor	Joe Bull

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[8]Appendix 6, P. 35.

Dr. Thomas W. Jensen, M.D.
Lion's Club
Steve Bingham, EAC Professor, Botany
Tom Waddell, Arizona State Game and Fish
Bureau of Land Management
Bureau of Indian Affairs
State Air Quality
Safford Ranger District
Supervisor's Office, Coronado National Forest

ALTERNATIVES EXPLORED

1. Maintain Status Quo

This alternative would continue the present fire management policy calling for quick suppression of all fires. It would continue to allow buildup of fuels which would result in hotter fires. Environmental changes associated with the absence of natural fire would continue.

2. Shorten Prescribed Natural Fire Season

Only allow natural prescribed fire after the Bermuda High is well established and the fire danger is moderate or low. This alternative would restrict fire to snags and small (1/10 acres or less) spots and would not fulfill the objective of this plan.

3. No Fire Suppression

In this alternative, there would be no fire suppression at any time in the Galiuro Mountains. This might be the ultimate best alternative, but it is not considered feasible at this point in time. More research into fire's effect on this ecological unit is needed.

DECLARATION OF A NATURAL FIRE

Based on ecological and resource data of the Galiuro Mountains, special decision-making tables[1] will be used to make decisions concerning natural fires. If all prescription criteria are met, the fire will be declared a natural fire. If one of the prescription criteria is negated, the fire will be declared a wild fire and limited or total suppression action may be taken.

The first sighting of a possible natural fire most likely will be made by the District's aerial observer. After giving the exact location, the fire will be plotted on a topographic block map. Based on this information, plus fire behavior data furnished by the observer, the initial decision and declaration that it is a natural fire will be made by the District Ranger or his representative. If there is any uncertainty in data presented, a special surveillance flight will be made by the Ranger or his designated representative to make a definite decision.

If a natural fire crosses a block boundary into another preattack block, that part of the fire will be regarded as a "new start" in the latter block, and must meet all prescription criteria before that section of the fire will be declared a natural fire.

Once a "new start" is declared a natural fire, constant and daily review and reevaluation of the prescription will be conducted. One evaluation tool will be the detailed vegetation description and fuels information which will be available at the District and the Supervisor's Office. Descriptions written by field personnel are available for nearly every type of cover and fuel mapped as part of the plan. These reports contain age class, percent of dead material, fire history, fuel type and volume, canopy (open or closed), height of crowns, ground cover type and a photo of the area. These reports are indexed for ready use and are keyed to the block maps.

When partial or total suppression becomes necessary, fire overhead and suppression crews will be called as needed. The position and numbers will depend on the suppression job to be accomplished.

The suppression job to be accomplished will be in accordance with the definitions as stated in the glossary of terms section for partial and total containment. Suppression tactics in the Wilderness cannot exceed what was specified in the Galiuro Wilderness Management Plan, approved in 1972. The job will be one of containment of the fire perimeter and halting fire spread, but will not be the complex, costly fire suppression effort normally applied to wild fires.

Fire Danger Evaluation

Manning class for each fuel model will be used to set up prescriptions for fuel models. Weather information used in these classes will come from:

Fuel Model A - Sierra Vista
Fuel Model B - Sahuaro
Fuel Model C - West Peak
Fuel Model G - Palisades

The prescriptions for fuel models are outlined in Appendix 1.

Qualification of Personnel (Involved in decision making regarding natural fires)

Since decisions regarding natural fires are the responsibility of the District Ranger or his designated representative, his job description, or that of his primary fire staff, include fire management responsibilities based on the following selection criteria:

1. Have had substantial fire experience.

2. Be rated as fire boss 3 or higher.

3. Have had intermediate level fire behavior training.

4. Have an interest and be well versed in the concept of natural fire management principles.

5. Be kept current in fire activities:

   a) member of fire overhead team

   b) actively participating in fire control activities on and off Forest

   c) attends yearly fire training sessions

   d) participates in planning and executing prescribed burns.

Considerable input into the decision-making process will be required of the Forest Fire Management Officer; therefore, the individual filling this position should meet, and preferably exceed, many of the foregoing selection criteria. He especially should be well trained in advanced fire behavior and be well oriented in new fire management thinking.

FINANCIAL MANAGEMENT

Initial Sighting

The initial sighting of a possible natural fire will be regarded the same as any fire reported or seen during routine fire detection flights. Financing of the initial reconnaissance of possible natural fires--until declared a natural fire--will be charged in accordance with FSM 5192.22 9(a)(b)--Aircraft.

Monitoring

Monitoring of a natural fire that is either small in size (less than ten (10) acres), not crowning or running, or having low potential toward developing into a large fire, may be needed only occasionally. Close coordination should be exercised and attempts made to schedule natural fire monitoring during routine forest detection flights.

Monitoring of a natural fire that has attained a size of ten (10) acres, or is having some running or crowning behavior throughout the day, generally will be conducted daily. When such fire behavior exists, weather conditions probably will necessitate daily detection flights. This will minimize the cost for natural fire monitoring.

It will be necessary for the Forest Supervisor to budget some P&M funds strictly for natural fire management. These funds should be assigned to the Safford Ranger District. Until actual operational costs become known, a proper and reasonable estimate will be used during the initial years of operation.

Surveillance flights which cannot be coordinated with routine detection flights will be paid for from a special P&M fund.

Personnel used in operational aspects of the fire management plan normally will be financed from their regular budgeted salary. If extra hours occur outside the regular duty hours, overtime will be financed from a special P&M fund.

Payment for helicopter use in the case of evacuation for purposes of public safety will be financed from the special P&M fund.

Suppression

When prescription criteria are negated and either limited or total suppression action must be taken, the fire will be declared a wild fire and FFF will be used to bring it back to prescription or suppress it entirely. All activities, equipment, tools, extra personnel needed to perform the necessary limited or total suppression will be financed the same as suppression on all wild fires. Follow-up cost, such as patrols, replacement of tools, etc., also will be financed the same as on other wild fires.

Payment of personnel needed for limited or total suppression will be conducted in accordance with FSM 5192.22 for time encountered during the regular tour of duty and overtime hours.

Public Safety

The Forest Service will perform and provide all means possible to minimize the chances of endangering personal safety of users in the Galiuro Mountains as a result of natural fire management.

When a possible natural fire is first sighted, the aerial observer will make a thorough search of the area around the fire and the entire drainage in which the fire is located in an attempt to locate persons in/or enroute to the immediate vicinity of the fire. If any people are sighted, a message will be dropped, if possible, explaining any dangers that might exist, or giving direction to safe areas.

In the event of an emergency where evacuation appears necessary, a helicopter will be dispatched. If the situation is not one of imminent danger, but it is felt that a warning is needed, the nearest Forest officer will be sent to make the contact.

Once a fire has been declared natural, information listing map location, fire behavior, expected dangers, and precautions to be taken will be posted at all trailheads. The same information will be radioed to all Forest Service personnel working in the Galiuro Mountains so they can alert visitors. If necessary, a Forest Service employee will be assigned to the vicinity of the fire as an additional safety precaution to the public.

RECORD, REVIEW, AND REVISIONS

Reporting

All fires allowed to burn will be reported immediately by the Forest Dispatcher to the Regional Office. A daily situation report will be made. In addition, the overall fire situation throughout the Western United States will be monitored daily and evaluated accordingly with regard to natural fire decisions. All actions and decisions made regarding natural fires will be documented.

An annual review of each year's operation will be conducted and an annual report will be prepared and submitted to the Regional Office. Any urgent changes in the plan will be submitted immediately for approval. One additional preattack block will be completed each year: 1977, 4C; 1978, 4A; 1979, 4E; and 1980, 4B.

GLOSSARY OF TERMS

Prescribed Natural Fire - A fire allowed to burn in harmony with existing physical land features and weather conditions, in accordance with established prescription criteria.

Wild Fire - A fire burning in harmony with existing physical land features and weather conditions, but not in accordance with established prescription criteria or present management decisions.

Partial Containment - Halting of fire spread at the head or that portion of the flank that may be threatening to cause natural fire to go beyond prescription criteria, and ensuring that spread will not be encountered again. Does not not necessarily indicate complete mop-up.

Total Containment - Halting of fire spread along total perimeter of the fire, and ensuring that fire spread will not be encountered again. Does not necessarily indicate complete mop-up.

Delayed Suppression - This delay can be implemented when long-term weather predictions indicate the measured fire danger will return to the approved prescription within a few days.

Total Suppression - Halting of fire spread along the total perimeter and complete mop-up of the entire fire area.

APPENDIX

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APPENDIX 1

FUEL MODELS

The use of prescribed natural fire is founded on specified basic criteria being met, plus a fire danger prescription for each of the fuel models used in the National Fire Danger Rating System.

The fuel models are:

MODEL A - Cover types represented here are grasslands and others where the primary carrier of fire is a continuous bed of fine fuels. Brush or trees may be present, but the crowns should not occupy more than one third of the area. Examples of types covered by fuel model A are western grasslands. Open stands of pinyon juniper and desert shrubs, such as mesquite, creosote bush, and palo verde, may be included; but fire spread will be overrated during those periods when grazing or lack of rain prevents herbaceous ground fuels from developing.

MODEL B - This model represents chaparral or other dense brush, and recently partially cut or thinned. Typical cover types are mature California and some other Southwest chaparral.

MODEL C - In this model grass or other herbaceous plants are the primary carrier of the fire. This overstory is typically open, occupying one third but not more than two thirds of the area. Usually enough branch material is on the ground to contribute significantly to fire intensity. Desert shrubs and pinyon juniper stands are included where a continuous ground fuel develops most years and where pinyon makes up more than one third of the stand.

MODEL D - This model covers those chaparral situations which are not dense enough or heavy enough to qualify for model B. Usually the living foliage burns readily.

MODEL G - This model applies primarily to dense conifer stands where a heavy buildup of downed tree material has accumulated. Natural breakup of overmature stands, insect and disease damage, wind or ice storms, and thinnings or partial cuts are typical events that create the heavy amounts of fuel which typify this mode. The canopies of these stands are usually closed but large openings, the result of the downing of timber, are common. Deep litter and a very high loading of dead fuels larger than one inch in diameter also are characteristic. The amount of undergrowth may be quite varied. Types covered by fuel model G are hemlock-Sitka spruce, coastal Douglas fir, or windthrown or bug-killed lodgepole pine and spruce; also, thinned or partially cut conifer stands where there is heavy slash after the fines have dropped off and the slash has settled.

APPENDIX 2

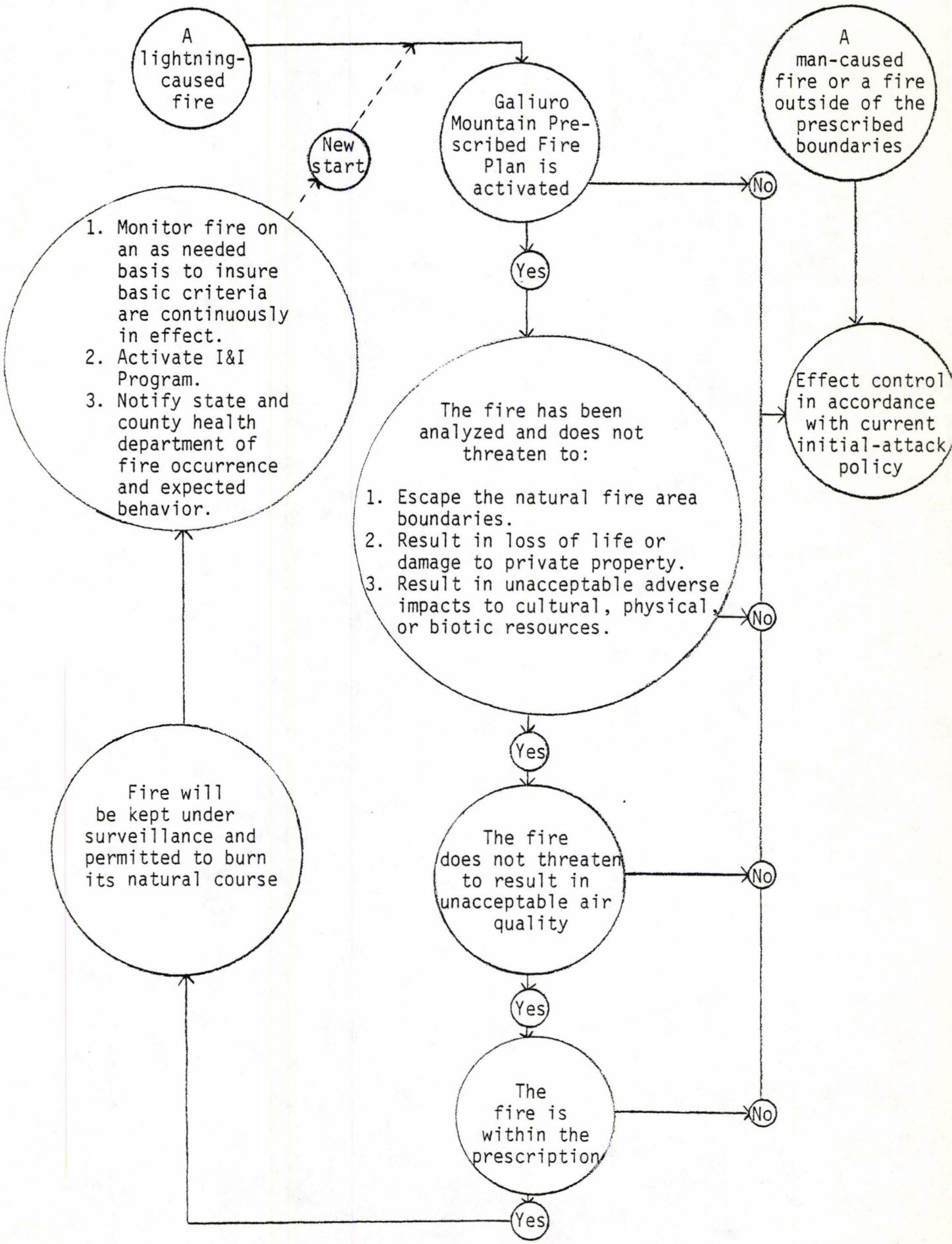
THE PRESCRIPTIONS

All Fuel Models (A,B,C, and D)

Natural fires will be allowed through Manning Class III (within the respective fuel models). When fire danger reaches the midpoint of Manning Class III, a monitoring/suppression crew will be placed on the fire and will monitor it on the ground until the fire is out, or the fire danger drops below the midpoint of Manning Class III. The requirements outlined in the operational plan will be met for all natural fires.

APPENDIX 3

DECISION FLOW CHART FOR FIRE OCCURRENCE IN THE GALIURO MOUNTAINS


A lightning-caused fire
New start
Galiuro Mountain Prescribed Fire Plan is activated
A man-caused fire or a fire outside of the prescribed boundaries
No
Yes
1. Monitor fire on an as needed basis to insure basic criteria are continuously in effect.
2. Activate I&I Program.
3. Notify state and county health department of fire occurrence and expected behavior.
The fire has been analyzed and does not threaten to:
1. Escape the natural fire area boundaries.
2. Result in loss of life or damage to private property.
3. Result in unacceptable adverse impacts to cultural, physical, or biotic resources.
Effect control in accordance with current initial-attack policy
No
Yes
Fire will be kept under surveillance and permitted to burn its natural course
The fire does not threaten to result in unacceptable air quality
No
Yes
The fire is within the prescription
No
Yes

APPENDIX 4

EFFECTS OF PRESCRIBED FIRE ON THE RANGE RESOURCE IN THE GALIURO MOUNTAINS

At the present time, range conditions in the Galiuro Mountains range from poor to very good. In much of the area, present range conditions are the result of heavy overgrazing in the past, which allowed grasslands to convert to brush. Browse ranges, which in the past were periodically swept by fire and thus kept available for cattle, have now become too dense for good or, in some cases, any utilization. Pinyon-juniper has become so thick in many areas so as to preclude any understory of herbaceous plants. Again, a combination of overgrazing and elimination of fire has done the deed.

Prescribed natural fire, as outlined in the plan, would initially affect the range resource by removing forage; however, grasses would begin to respond immediately to the nutrients added to the soil by the fire ash, the moisture from rainy season and, in many cases, the removal of dead plant material. By one year from the date of the fire, the burned area will respond with production at least equal to and, in most cases, greater than current levels. This is evidenced by production levels inside versus outside burned areas in the Galiuros.

Stagnated browse stands would be opened up, allowing for the establishment of new plants, release of residual herbaceous understory and improved cattle access. Removal of browse plants also will increase water flow in creeks and springs temporarily.

Fire, as described in the plan, will have the least effect on the pinyon-juniper areas. Fire intensity will not be great enough to affect this type very extensively. It is expected that some small, irregular openings will be created, allowing grass to come in.

While it is conceivable that a large enough area of forage could be burned off at one time so as to adversely affect grazing, this is highly unlikely under the conditions outlined. In addition, most ranchers are so overwhelmingly in favor of a "let burn" program that they would be more than willing to accept a temporary adjustment in livestock numbers, should it become necessary.

The most detrimental effect that prescribed natural fire will have on the range resource will be to improvements, primarily fences. Many of the fences are of wooden post and wooden stay construction, which would be destroyed by fire. Provisions will have to be made to replace these fences, if they are destroyed. There is also a possibility of some plastic pipeline being destroyed. Again, however, the ranchers are willing to take the risks involved.

Should rehabilitation measures become necessary, seeding with cool season grasses and forbs would improve the quality of the forage resource.

DICK RHEA
Range and Wildlife Staff

APPENDIX 5

WILDLIFE

Wildlife populations in the Galiuros have evolved in association with periodic natural fires. This is true to most of Southeastern Arizona. As a result of overgrazing and lack of fire in the recent past, plant and animal communities have gone through fairly drastic changes. Density of woody vegetation in the pinyon-juniper, mesquite and oak vegetative associations has increased greatly with a lack of fire at the expense of understory herbaceous plants. This has had a significant effect on wildlife species associated with these associations.

Plant diversity is the key to wildlife diversity. Plant diversity, both within and between vegetative associations, has decreased due to the lack of fire. Some of the wildlife species which are adversely affected by this lack of diversity are the mule and whitetail deer, Mearn's quail, javelina, coyote and mountain lion, to mention a few.

Browse stands, which are very valuable to mule and whitetail deer, mature over time; and their value to these herbivores declines until the stands are rejuvenated by fire or some mechanical means. Fire provides an excellent opportunity to rejuvenate these mature, and sometimes decadent stands, economically. Burning browse stands release nutrients to the soil which show up almost immediately in improved palatability and nutritional content for the herbivores.

Very large burned areas with no unburned islands are detrimental to most species. This is seldom a problem, however, because most fires burn with irregular boundaries and have numerous islands within the outer perimeter of the fire. These islands and fingers of unburned vegetation generally are adequate for escape cover in even the largest of fires, especially in broken terrain like the Galiuros. Some of the smaller animals are the most seriously affected by fires, since they cannot escape the oncoming fire. Following fires, these populations generally are the quickest to respond, due to their higher reproductive rates. Populations of many of these species are back in pre-fire levels in just a few years following the fire, as quality and quantity of food increases.

Wildlife habitat improvement through seeding of cool season grasses and forbs is made possible through seedbed preparation which results from fire. Excellent stands of desirable wildlife species have been established on burned areas in Arizona. Erosion control seed mixtures should include wildlife forage species to take advantage of this opportunity.

STEVE LOE
Wildlife Biologist

2500 Watershed
5150 Fuel Management

May 3, 1977

Prescribed Natural Fires - Galiuro Mountains

Charles R. Ames, Range and Wildlife

During the week of March 14-18, 1977, a team of specialists conducted an on-the-ground review of proposed prescribed natural fire areas in the Galiuro Mountains. Participants were Cecil Sims, District Ranger; Walt Friauf, Fire Control Officer; Andy Travers, Range Conservationist; Chuck Duncan, Range Technician; Mike Issacson, Permittee, and I.

On March 14, we left Deer Creek for Mud Spring and then around to China Peak. From there, we went down Sycamore Canyon to Rattlesnake Canyon and up to Powers Garden. Vegetation on this area was a mixture of side-oats grama, blue grama, hairy grama, cane-beardgrass, wolftail, scrub oak and juniper. Brush density is not excessive, with some areas showing fair stands of grass and browse. The periodic burning at China Peak has increased the vigor, density and composition of both grass and browse plant species. Soil erosion is minimal on the burned area, due to the improved ground cover. Three head of whitetail deer were seen near this burn area.

Fire will burn in the bottoms of Sycamore and Rattelsnake canyons; but, due to the reduced ground-cover density from cattle grazing, the acres burned and watershed impacts will be minimal. The exception would be during low precipitation periods of the year, when fire could get into the crowns of some of the deciduous and coniferous species. Then, impacts would be due to some surface erosion in the bottom being delivered directly to the channel and some nutrient loading because of ash which could be washed into the system. This would be a short-term effect, since most of these streams are ephemeral and only flow during periods of high intensity rainstorms.

On March 15, we rode out of Powers Guard Station up South Field Canyon to the ridge and then south to an area called Grassy Ridge. From there we dropped off to the east to Grassy Tank and back into the head of Rattlesnake where it breaks from Kielberg Canyon, then back down Rattlesnake to Powers Guard Station. Brush density in this area increased over what was observed on the east slope. Species composition was scrub oak and juniper, with a sparse grass understory, estimated to be less than 5 to 10 percent of the basal area.

Slopes in these areas generally are steeper than on the eastern slope. Soils are relatively shallow with surface and bedrock prevalent. Removal of overstory vegetation in these areas could cause an impact on the watershed conditions, if localized high intensity summer storms were to occur after treatment. Presently, rill and surface erosion is occurring underneath the brush overstory. Therefore, it is my opinion that brush conversion to grass and browse species would be more favorable to the watershed condition.

Grassy Ridge has reburned on an average of every five to seven years. It is obvious that the recurrence of burning has established a favorable composition, vigor and density of grass and browse species. Basal density of the grass species would be approximately 30 to 35 percent. Soil loss is minimal, due to the good ground cover conditions. Five head of whitetail deer were observed at the south end of the burn. It appears that wildlife use is associated with these burned areas. Pellet groups were more numerous in the burned areas, rather than the unburned areas.

On March 16, we left Powers Guard Station and proceeded up Corral Canyon, past Corral Spring toward Kennedy Peak, then south along the ridge toward the head of Douglas and Rattlesnake canyons. This area generally was not as steep, and the vegetative composition had changed from that of the previous day's ride. Parent material appeared to be more mineralized, thus weathering to produce a more productive soil with A and B horizons. Brush composition was oak and juniper, with manzanita becoming more predominant on the driest slopes at higher elevations. Some ponderosa pine and Douglas fir were observed in the canyon bottoms and headwaters, which opened into a bowl shaped basin.

Vegetative ground cover (grass) is relatively sparse underneath the brush canopy with basal area about 5 to 15 percent. Observation of previous burns indicates a minor impact on watershed conditions. More often than not, significant erosion is caused by machinery on the slopes, rather than fire. The exception would be high intensity summer storms which could occur over the area shortly after the burn.

In the areas at the heads of the canyons, the soils are more developed, with a thick litter and duff layer. Fire could cause a hydrophobic condition, whereby rainfall would be repelled by the soil, thus increasing runoff and surface erosion; however, the acreage is small, as related to the total prescribed natural burn area.

On March 17, we left Powers Guard Station and proceeded up Rattlesnake and topped out into the head of Kielberg Canyon. From there we continued past Kielberg Tank, the old Powers Mine Cabin, down around Echo Spring and Cedar Flat. It was in this area that we encountered a large burn which occurred approximately ten years ago, burning a significant number of acres. After riding through this area, we proceeded on down the trail, past Hooker Cabin and Redfield Canyon and down into the Jackson Cabin area.

The southern part of the Galiuro Mountains, from Kielberg Canyon south, is in the Redfield Allotment. This area has less brush cover, with a better composition and density of grass species, both in the burned and unburned areas. Species composition is predominantly sideoats grama, blue grama, hairy grama, wolftail, cane-beardgrass and bullgrass. In burned areas, plant vigor was good, with basal density estimated at 30 to 35 percent. The browse in the area had a good form class, showed signs of good vigor and moderate utilization, mainly by wildlife. Livestock use appears to have been minimal in the last several years. This could be due to a lack of water both at Cedar Springs Flat and Knothe Spring.

The area south of Hooker Cabin to Jackson Cabin is fairly open from brush. Grass species vigor and density is less in this area. This is attributed to the continued overuse by livestock in the past.

On March 18, we rode east from Jackson Cabin towards the head of the South Fork of Ash Creek. Grass, browse density improved on the steep, rocky slopes after leaving the flat, soft areas. Apparent problems with livestock distribution have decreased grass density, vigor and composition, making it doutbful whether fire could spread in this area. Present watershed impacts from grazing are greater than that which fires would contribute.

A literature review of areas having similar vegetation, topography and climate indicates that prescribed natural fires usually are not harmful to the soil or water quality and quantity in the desert grassland-shrub type. A study conducted by Glendening, Pase and Ingebo in 1961 on the effects of wildfire in chaparral concluded that a combination of wildfire and chemical treatment controls sprouting of the brush cover most effectively. The amount of sediment yielded from burned areas varied with treatment and seeding conducted. Areas that were burned, chemically treated and reseeded produced the least amount of sediment. Also, water yield, as a function of precipitation, exceeded measurements made prior to the burning.

A study by Brown in 1970 indicated that both burning and chemical treatment increased water yield by as much as three times. Another study by Pase and Ingebo in 1965, for burning chaparral and converting to grass on granitic-type soils, found that with the use of 245T and wildfire, brush resprouting was reduced to less than ten percent of the original density. Grass basal density increased, as compared with pre-treatment values. Adjacent areas not chemically treated returned to a brush cover in approximately five to seven years. Water yeild increased significantly, while sediment yields increased for a short period (one year) and then declined to pre-treatment levels within five years.

A study by Tiedemann and Schmultz in 1966, on the effect of controlling and reseeding of oak chaparral type in Arizona, concluded that a combination of burning and reseeding was the most effective in controlling the brush species. Otherwise, brush production reached near pre-fire levels within five to seven years. Also, they found that grass production significantly increased on the treated areas, and the length of the effectiveness and the amount of production was dependent upon the type of treatment and the number of years following the treatment. This would indicate that reburning of prescribed natural areas within a rotation of approximately five to eight years is needed to maintain a healthy stand of grass and browse plants for livestock, wildlife and watershed values. A study by Rich in 1962, on the effects of wildfire in the ponderosa pine type in Arizona, concluded that sediment yield following a fire was approximately .02 feet per unit area, which was not above the normal level before the fire; however, the area was successfully seeded to a perennial grass immediately after the fire. Above average summer storms did not result in a significant increase in annual streamflow.

A study by Biswell and Schultz in 1957, on runoff and erosion in relation to prescribed burning in the ponderosa pine type, found that no appreciable amount of surface runoff or erosion could be related to the burn itself, even after periods of above normal rainfall on the area. They found that decomposed duff remaining after the burn acted as a buffer and maintained a high percolation infiltration rate on the area. Surface erosion was not a problem; however, this is true only in a prescribed natural fire or wildfire situation where no soil disturbance had occurred due to mechanical equipment.

A study by Pase and Lindenmuth in 1971, in the oak, mountain mahogany-chaparral type, concluded that most shrubs resprouted and quickly reestablished themselves in the site where they originally occurred, mainly Ceanothus and manzanita came back abundantly; and herbage cover was low after the fire, but increased quickly. However, grass density and production was low before the fire and continued to be low after the fire, even to a point where the brush reclaimed the site. However, I believe this might be attributed to the lack of a residual grass seed source. Sediment production was .30 acre feet per square mile per year after the burn.

In conclusion, they believe that temporary control of oak, mountain mahogany and chaparral with prescribed natural fire was only temporary. However, it was the best technique available with the least amount of soil erosion to a site, as compared to wildfires or broadcast fires, which were less carefully controlled, either through prescription or execution. Another study by Henricks and Johnson in 1944 evaluated fire and its effect on soil loss from various slopes in Arizona. Heavy soil losses were recorded on burned areas during the summer following the fire, even though they did not have above normal rains.

The above reference material basically indicates that prescribed natural fires in the desert shrub type in Southern Arizona generally will have little adverse effect on the watershed condition from either surface erosion or runoff and channel degradation. Exceptions can occur during periods when localized heavy thunderstorms occur over a burned area immediately after the burn. Ash can cause nutrient increases in the channels; but, due to the limited amount of perennial water, this should not be a factor.

I recommend that the prescribed natural fire plan for the Galiuro Mountains be approved from a watershed standpoint. This decision is based on the literature review conducted and from field observation.

WALTER C. STEPHENSON
Forest Hydrologist

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GILA VALLEY CLINIC
GENERAL MEDICINE & SURGERY

T. W. JENSEN, M.D., DABFP
L. R. MANSUR, M.D., DABFP
T. F. GRIFFIN, M.D.
J. S. ANUSEWICZ, MX.

March 25, 1977

Mr. Cecil Sims
District Ranger
U. S. Forest Service
Post Office Building
Safford, Az 85546

Dear Cecil,

I want to thank you for having me along on the ride last week into the Galiuro Wilderness Area. I thoroughly enjoyed it.

I have been associated to greater or lesser degree with the Forest Service professionally, socially and casually over the last 20 years, as well as with the local ranching population. I have been impressed many times by the differences of opinion. I felt it very fair that you had two ranchers on parts of that ride. I was also encouraged at the degree of cooperation between the ranchers and you folks.

I think it's an experience to be out in the actual country. It's also an experience to be exposed to the philosophies and theories and attitudes of the Forest Service regarding the lands of which they are custodian. It seems to me that the proposed burning regulations would be most beneficial to the land involved and also in the long run to the general public.

Again, thank you very much for allowing me to be on the ride. I really did enjoy it thoroughly.

Sincerely,

Tom Jensen

T. W. Jensen, M.D.

TWJ:db
cc: Walt Friauf

APPENDIX 6

GALIURO MOUNTAINS
NATURAL FIRE BY PRESCRIPTION
I & I PROGRAM

The purpose of this program is to inform the public to the fullest extent of the prescribed natural fire plan for the Galiuro Mountain range, to inform users of the Galiuro Mountain range of possible prescribed natural fires and their hazards, and to gain public understanding and acceptance of the need for prescribed natural fire.

DESIRED PRODUCT	ACTION TO BE TAKEN	WHEN
Inform the public of the proposed prescribed natural fire plan and obtain public understanding and acceptance of the need for prescribed natural fire in the Galiuros.	A. Prepare an informational letter explaining our proposed action and mail to key individuals and groups listed below. 1) All persons holding forest permits on the Galiuro portion of the Safford Ranger District. 2) All private landowners adjacent to the National Forest land of the Galiuros. 3) Bureau of Land Management, Safford District. 4) State Forester (State Land Department.	January 1976
	B. Prepare a feature story on prescribed natural fire for media use.	February 1976
	C. Obtain or develop and distribute a brochure to inform the public on prescribed natural fire and its benefits.	February
	D. Route a copy of the prescribed natural fire plan for the Galiuro Mountains to the Bureau of Land Management and the State Land Department.	When completed

DESIRED PRODUCT	ACTION TO BE TAKEN	WHEN
	E. Keep supply of brochure in "C" above in office and with each Fire Prevention Technician. Fire Prevention Technicians should be able to discuss prescribed natural fire with forest users.	Continuing
Inform the forest user of possible prescribed natural fires, their hazards, and precautions to take.	A. Develop a special handout on prescribed natural fire with a schematic trail map of the Galiuro area and what to do when in the vicinity of a prescribed natural fire.	March-April
	B. Place above handout at all wilderness registration stations prior to beginning of prescribed period each year.	Each year prior to July 1.
	C. The Galiuro Fire Prevention Technician and Galiuro Suppression Crew Foreman should be given special training on prescribed natural fire and be able to fully discuss the prescribed natural fire program with any wilderness users.	Training to be given March and April, and to be continually updated.
	D. Each year prior to the beginning of the prescription period a news release summarizing the prescribed natural fire plan.	Each year prior to 7/1.
	E. Prepare a news release each time a prescribed natural fire is in progress.	

APPENDIX 7

Excerpt from Galiuro Wilderness Management Plan, approved 11/3/72:

H. Fire

"Fires will be suppressed at all times beginning in the spring when the fire danger first reaches moderate and extending to when precipitation from the Bermuda High becomes well established."

"Fires occurring any other time of the year, take prompt control action if major fire danger is high or above or is predicted to become high. Delayed initial attack will be allowed only on areas having a preattack plan completed through Step Four. When the preattack plan is completed, it will then be possible, when the fire danger is moderate or low, to delay initial attack on an individual case basis. Initial attack may be delayed on fires burning on hillsides and ridges which are surrounded by natural barriers such as rock outcrops and rocky canyon bottoms. If ultimate cost of suppression is to be increased by delayed attack, fire will be suppressed immediately or the added cost of suppression will be paid from other than Forest firefighting funds. This Wilderness fire policy will be adjusted as new techniques for Wilderness fire management and financing are developed."

The terminology of this plan has been coordinated with units of the National Park Service in the Southwest that are conducting similar programs.

APPENDIX 8

PREATTACK PLAN TITLE PAGE

1. PREATTACK PLANNING BLOCK PLAN FOR BLOCK 4D, GALIURO MOUNTAINS, SAFFORD RANGER DISTRICT, CORONADO NATIONAL FOREST.

2. Preattack Planning Decisions made in advance for this block, using Table #1 of R-3 Supplement to FSM 5130.3 for analysis are:

   a. When possible, fires escaping initial attack will be controlled before 10 A.M. the next morning, using direct attack if possible, or by indirect attack using the nearest tenable topographic features.

   b. Preattack Block Priority III.

      i. Preattack Planning will be accomplished by preestablished District Block Priorities.

      ii. Multiple fires escaping initial attack will be allocated suppression resources based on preestablished Forest Block Priorities.

      iii. Suppression resources for initial attack will be allocated based on preestablished Forest Block Priorities.

3. Planning intensity moderate.

   This section prepared by: Walter C. Friauf, D.F.M.O. — 6-29-77 Date

   Approved by : K.R. Weissenborn, Forest Supervisor — 7/1/77 Date

4. Preattack planning was initially completed by Walter C. Friauf on October 15, 1976.

APPENDIX 9

BLOCK DESCRIPTIONS

There are five preattack blocks in the Galiuro Mountains: 4A through 4E, which range in size from 25,500 acres to 43,000 acres. Because of geographical features, some of the block boundaries are outside the Forest boundary.

Block 4A of 36,000 acres is in the northern one fourth of the mountain range and is primarily fuel Model A and C with desert shrubs and juniper. The ridges are mostly open. The west side is very steep with many rock faces. There is very little fuel outside the Forest boundary.

Block 4B of 36,000 acres is on the west side of the range. This block is mostly fuel Model B with some A along the extreme west edge. There is some mixed conifer in Rattlesnake Canyon. The west boundary is very steep with many sheer cliffs. Powers Garden Administration Site and Powers Cabin Historical Site, and also another cabin (Knothe), are in this block.

Block 4C of 43,000 acres is on the east side. All but the northeast portion of this block is fuel Model B with some mixed conifer in the canyons and scattered along the ridges.

Deer Creek Administration Site and 180 acres of private land are along the east boundary. Both of these areas are surrounded by light fuel and could be easily protected.

Block 4D is in the southwest corner of the range and is 25,500 acres. Except for ridgetops, this block is fuel Model A with some Model C on the higher ridges. Jackson Cabin is in this block and is surrounded by very light fuel. The west, south, and east boundaries have many rock faces that act as natural barriers. Canyon bottoms are mostly open with some scattered oak and sycamore.

Block 4E of 27,500 acres is on the southeast end of the range. It is primarily fuel Model B with some mixed conifer in the canyons. At the lower elevations, there is fuel Model A along the east and south boundary. In the northeast corner there are about 500 acres of private land in High Creek and Oak Creek. These areas are protected on the west side by fuelbreaks and by open grassland on the south, east, and north.

APPENDIX 10

CORONADO National Forest

FIRE OCCURRENCE MAP, SAFFORD R.D.

1949 - 1974

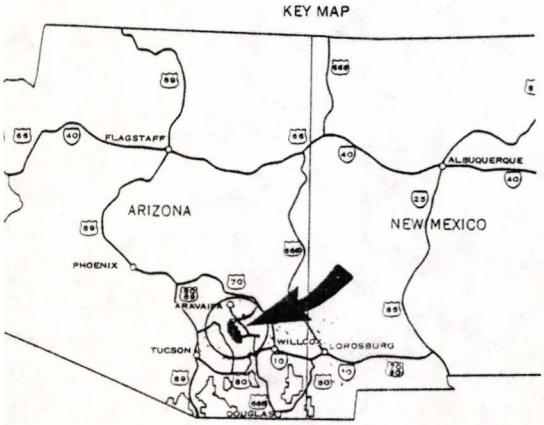
SIZE CLASS	MAP SYMBOL
- ¼ Acre or less	1
- ¼ to 9.9 Acres	2
- 10 to 99.9 Acres	3
- 100 to 299.9 Acres	4
- 300 to 999.9 Acres	5

LEGEND

- PREATTACK UNIT BOUNDARY
- National Forest Boundary
- Adjacent National Forest Boundary
- County Boundary
- Reservation Boundary
- Wilderness and Primitive Area Boundary

1 ½ 0 1 2 3 4 5 Miles

KEY MAP



APPENDIX 11

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